FCC RF Exposure and Maximum Permissible Exposure Calculation

Project: E10596-1304
EUT Description: Remote Firing Device
Model No.: 1673-1 and 1673-2
FCC ID: CW21673-1(Controller) and CW21673-2 (Remote)
IC: 2758A-16731 and 2758A-16732

FCC Applicable Standards

According to §1.1307(b)(5), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.
- This is a Mobile device as defined in §2.1091.
- KDB 447498 D01 General RF Exposure Guidance v05 was used as the guidance.
- According to the procedures in §1.1310 and §2.1091 RF exposure is calculated.

RF Exposure Calculation Data:

Frequencies used: 150-174 MHz
Modulation: F3D
Mid-Channel: 161MHz
Antenna Gain: G = 1.0 dBi (detachable antenna is included with the product)
The Max Peak Power Conducted measurment is: 5.5Watts

Duty Cycle:

The information passed over the air is small data packets containing a limited set of commands and responses, there is no transmission of arbitrary data, or voice. The duty cycle of transmission is extremely low. The normal operation would have perhaps 15 command / response transmissions, consisting of approximately 300ms bursts over the period of 10 minutes or so. This may typically happen once or twice a day, for an overall transmission duty cycle of approximately 0.8% during each use.

Total duty cycle over the 10Minute period : 15pulses x 0.3ms pulse duration = 4.5sec/10Minutes = 4.5sec/600 sec = 0.75%

Power level after duty cycle reduction = 5Watts * 0.0075 = .0375Watts

The intended use of the Transmitter will be on the ground or on a table top. Except for the momentary exposure during setup of the Transmitter, the expected occupancy range to the hands in normal usage is approximately 50mm to the antenna in some situations.

SAR Evaluation

According to the requirement of KDB 447498 D01 General RF Exposure Guidance v05 , SAR evaluation is not required when the corresponding SAR Exclusion Threshold condition is satisfied:
1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·
] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

(0.0375W / 50mm) x √0.150 = 0.00029

SAR evaluation is not required since the transmitters power level 0.00029 is < 7.5 for 10-g extremity requirement.

Calculations for Maximum Permissible Exposure Levels (MPE)

Power Density = $Pd_{(mW/cm2)}$ = $EIRP/(4\pi d^2)$

EIRP = P * G

P = Peak output power (mW)

G = Antenna numeric gain (numeric)

d = Seperation distance (cm)

$G = 10^{(G_{(dBi)}/10)}$

The use of this EUT requires the use of the General Population/Uncontrolled Exposure limit power density charts as defined in FCC §1.1310 and IC RSS-102.

For the Frequency Range 150 to 174MHz is a maximum of $1.0 mW/cm^2$

Antenna Gain (dBi)	Antenna Gain (numeric)	Duty Cycle corrected Output Power (mw)	Calculated MPE @ 50mm (mW/cm^2)
1.0	1.26	37.5	0.75

This Transmitters uncontrolled exposure power density at 50mm or greater is less than $1.0 mW/cm^2$